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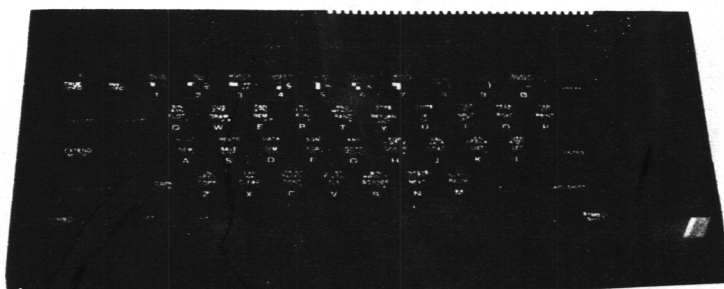
Inside the Timex

Service Code	Function
00	Write a block to tape
01	Write a block from tape
02	Read a bit from tape
03	Read an edge from tape
04	General tape routine
05	Load
06	Merge
07	Save
08	Change video mode
09	Write border colour (not permanent)
0E	Get bank number
0F	Get bank number
10	Enable bank
11	Goto bank
12	Call bank
13	Transfer bytes
19	Scan keyboard
1A	Sound chip registers
1B	BEEP
1C	COPY
1D	Send a character to the screen
1E	Set print position
1F	Fix attribute byte
20	Set system attributes
21	Clear input area of screen
22	Clear screen
23	Send printer buffer to printer
24	Send single line to printer
26	NEW command
29	Select current stream
34	Flash character in A to screen
3B	Execute BASIC line
4A	Free space left
4C	PAUSE command
4D	Break key test routine
57	Screen address calculator (as PLOT)

From Inside the Timex Sinclair 2000 Computer  
Jeff Naylor & Diane Rogers  
Sunshine Books  
12-13 Little Newport ST.  
LONDON WC2R 3LD U.K.

TAPE WORRIES

With this issue we begin Cedric Bastiaans series on tape loading. Cedric's first article, beginning on page 5, provides a detailed look at ZX-81 (TS1000) and 2068 (Spectrum) waveforms; what they are, how they should look, and how they perform, as well as some of the techniques involved in magnetic tape recording, as it applies to Compact Cassettes. The report is thorough and professional, as we expected, and we thank Cedric for the considerable time, effort and expertise which he has expended on the part of the Group.



LIST GROUP  
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MEETING NOTES: JUNE 9, 1985

The June meeting of LIST was held at the offices of In-flight services near Kennedy Airport on Sunday June 9th. Our thanks to Bob Gilder for the use of the space and the outstanding projection T.V. system. The system was put to very good use and allowed all attendees to see the demos at the same time.

Martin Helfgott demoed "Deus ex Machine" for the Spectrum. This is a very interesting, if unusual, "video game/experience" piece of software from the U.K. It takes several hours to complete and comes with an audio cassette "soundtrack". Jeff S's comments: "very new wave".

Next was a demo of YS (Your Spectrum) Mega BASIC. Mega Basic, though it does consume extra overhead in the Spectrum, is a good approximation of "Standard" Basic. It uses one keystroke/one letter command entry and adds several new commands to Spectrum Basic. There are windows, **Sprites** 3 Font styles, new sound and graphics (sprite) commands and much, much more. While perhaps a little memory intensive for true data processing applications, it should be very useful for presentations/graphics programs and games.

Martin H. also had a tape of the "New Tech Times" segment which covered Zebra Systems. Again the "big screen" was a real help in letting all the members see the "show".

Bob G. ran a 3-D "Animation" program on the Spectrum (actually a Spectrum +, nice keyboard) which was breathtaking.

Paul D. demoed the Oliger/Brzozowski "emulator-0" illustrated last meeting. By using the single command OUT 244,3 and RAND USR 0, from the keyboard, his TS 2068 becomes a Spectrum. The procedure is reversed with OUT 244,0. What Paul really likes about this system is the fact that absolutely no hardware handling has to take place to make the switch, the "EMU-0" board just stays in place at all times. The price is not bad either; Spectrum ROM's (Time ROM's) cost about \$10-13 (delivered) in the U.S., while Oliger boards sell for \$15.00. Bob G. showed us a low profile 28 pin IC socket which he had fitted up with 10K resistor packs (on D0 through D7). This assembly can be plugged into the second socket on the board and gives virtually 100% Spectrum compatibility.

Paul also showed us Nazir's bank switching board for TS1000 16K Rampacks. Full demo will be made next time.

John Bell demoed his voice recognizer. The hub-bub in the meeting room caused some problems, at first, but the computer was finally able to recognize Myles Cohen's "Yes" and announce the fact.

Chuck Russell distributed the first 6 copies of Library tape 3.5. The members who attended the meeting will be mailing the tapes out to the next member of their group in about a week. Members were reminded of the way our library tape system works:

1. You will receive the following:

- a) One (1) library tape - (in this case, #3.5) normally a full C-60 cassette of programs.
- b) One (1) blank or mostly blank cassette. It is your responsibility to add at least one (more is O.K.) program to this tape after the last program submitted by the previous tape holder. Only the first person in each loop starts with a truly blank tape.

c) Mailing labels for the rest of your group. After you have copied the Library tape and added your program to the blank tape (being careful not to erase other members programs), you must place one of the mailing labels on the envelope and mail the two cassettes and remaining labels to the next member.

d) One LIST mailing label - If you are the last member in your group, mail the two cassettes back to LIST. We recommend First Class mail - it should be under one (1.00) dollar.

e) One program List - Place the name of your program and its position on your counter on the program sheet. Make sure you go past the last member's contribution before adding your program to the "blank" tape. Please note the date you received the tape and the date you mailed them back out.

2. There are 15 "loops" of members. Loop size varies from 5 to 7 members. The tapes start at LIST, pass through the "loop" and return to LIST. The new programs received from the membership will be added to the next tape (e.g., #4.X). You are allowed to keep the tape one week. (Please be prompt, the sooner we get all the tapes back, the sooner we can issue the next version)

3. The program you add should be either:

- a) Your own work (any subject you like).
- b) A program from a newsletter, book, or magazine (Public Domain).

Please do not submit active commercial software for inclusion in the library. If you have software with which you have problems and which is no longer supported, it can be put on the blank tape as a "note-in-a-bottle". If someone here can help you use it, we'll let you know.

4. Please include documentation (e.g., REM statements) for your own programs. Written documentation is acceptable, but we would prefer that your directions be on the tape (in REM's or Menues) to keep mailing costs down. Magazine and book programs don't require additional documentation, as we assume all members already have the original publications (If you don't, you should not be using the program, anyway. This is obviously an honor system).

5. Place SAVE (to tape) commands in line 9999 and make the program BREAK-able. Place SAVE (to microdrive) commands in line 9998. Place SAVE (to Wafa drive) commands in line 9997. Do not use lines 9990 to 9996 if you can help it.



8/85

Remember - it's not just your programs which are held up if you don't send the tapes on in time - it's the programs of several others.

Paul D. issued advance copies of the July newsletters to all those in attendance. Only 30 good copies were returned from the printer. The next run was scheduled for June 17th and mailings should begin shortly thereafter.

#### NEXT MEETING

The July meeting of LIST will be at the Huntington Public Library (RT. 25A, in Huntington, about 4 blocks west of the RT. 110 Junction) on Saturday July 27th from 2-5PM. Jeff S. obtained this meeting room for us. (The library is closed on Sundays during the Summer only). Note the change to Saturday for this meeting only. Huntington Railroad Station is not within walking distance of the library, but bus service is available. Nazir P. was unable to attend the meeting, but is still working on a hardware project group. More to follow.

And finally, CEM Barut showed Paul D. his interface (using an 8255) and driver assembly for the Armatron robot arm (see the articles in Radio Electronics). He plans to demo the completed project at an upcoming meeting.

#### SPECIAL THANKS

To TS Horizons - Rick Duncan sent us about 20 copies of a recent issue for distribution to the membership. Not all were taken, as many members already subscribe. If you didn't get one, come to the July meeting and pick up a copy. T.S. Horizons is a fine monthly magazine for T/S computers. Their address is 2002 Summit Street, Portsmouth, Ohio 45662.

P.S. Please return the "free" issues if you can. We can then distribute them to other members.

#### HARDWARE GROUP MEETING

The first LIST Hardware Group meeting was held at NAZIR P.'s on Sunday June 23rd. A general "show-and-tell" was followed by a voice vote on group direction.

In the demo phase we saw:

1) Paul Donnelly showed us the Coleco Kid-Vid system. This is a tape recorder, 3 tapes, ATARI cartridge and earphone system intended for education use on the ATARIVCS. The addition of an 1/8" mini jack across the microphone and a Coleco power supply (\$3.00 at Odd-Lot), called Perma Power, provides an inexpensive (\$10.00 at Odd-Lot) second tape recorder. Best of all, Paul says the Kid vid recorder will load Q-saved tapes without the filter.

2) Nazir demoed the diagnostic tool. This device and software developed for it, allows the user to observe all the activity in a 2068 (control lines, addresses, etc) while single stepping through its programs. A really powerful troubleshooting aid.

Nazir also showed us his 16K Timex RAM Pack and bank switching adaptor, a complete 2068 driver RTTY receiver, a video input device for the 2068, and more.

3) Martin B. brought along his Centronics I/O port, voice synthesizer and software and hard wired crash preventor, (Martin used a diode matrix (yes, dozens of real diodes) to fool a ZX-81 into seeing a jump when it tried to reset-instead of Newing itself. Also on display was the ill fated Colorworks board. More colors than a 2068.

4) CEM showed his Centronics port and it was announced that he is working on the ARMATRON interface, seen in Radio Electronics Magazine.

5) Cedric B. had two excellent big keyboards with those missing features we've wanted, one for the 1000 one for the 2068.

6) Stewart N. had one of the two existing prototypes of the Zebra twistor. A nice looking double-sided board with space for Spectrum ROM, RGB and both 2068 and Specy Busses. It uses the design shown in recent issues of LISTing.

After a general review and discussion on what sort of projects the hardware group might wish to tackle, the following items were listed as desirable.

1. Oliger Cartridge board construction and/or use as emulator.
2. RGB adaptor, Internal or External.
3. Centronics printer port (general purpose I/O)
4. Twistor Boards
5. Joysticks for Spectrum (e.g., Kempston) and/or rapid fire.
6. Eprom programming
7. Bank Switching Boards (e.g., to use 16K RAM Pack, etc.).
8. Converting T/S1000 peripherals.

Since the skills range of those (20 or so) present varied so greatly, the consensus was that the Oliger board would be a good first project. Paul and Nazir will borrow the necessary funds to purchase Oliger cartridge boards, and the other parts required, for the 10 members who raised their hands. Once the hardware is received an "assembly" meeting will be set up. At that meeting, members will pay for their hardware, at cost and assemble the boards, under supervision. Most members want to install their Spect ROM's and thus make an EMU-0 and this will be done as well. The Oliger boards are estimated to cost \$15.00 each. Other members desiring to participate in the group should contact Paul through Box 438 to express their interest. Do not send money to LIST. If the initial group is successful, we will do it again soon. If interested, should plan to attend the assembly meeting as an observer and, of course, can vote on the next project.

Consensus was that bank switching boards (hopefully supplied by Zebra) and twistors should be next. In a few months, an 8 bit Parallel I/O port (probably Centronics compatible) will be made. Discussion on mapping, chips to use (Z80 PIO, 8255, etc.) bus compatibility and software must be held before a design is finalized.

The next hardware group meeting will be announced in LISTing and on the LIST SIG of Zebra's board. We'll be assembling the Oliger/Emulator board, so be sure to bring:

- 1) An 18-25 watt soldering iron
- 2) Fine gauge solder
- 3) A pair of nippers
- 4) An exacto knife
- 5) Small flat-bladed screwdriver
- 6) Pair of needle nose pliers

A magnifying glass and continuity tester (a VOM or the audio type sold for \$2.00 at Radio Shack) are highly desirable.

# PART I

## ADAPTING THE ZX81 RAMPACK TO TS2068

The adaptation of ZX81 peripherals to TS 2068 requires analysis and some thought. The complication arises because of the limited capability designed into ZX81. In other words, it is hard to make a universal bus adaptor which will make every ZX81 peripheral work with TS2068. Every case has to be studied carefully and then appropriate decoding and proper software used for the purpose.

In light of the above, let us define a limited objective for a bus adaptor, an adaptor which will enable TS2068 users to utilize a 16K RAMPACK as if it were in the DOCK bank, say, from address 32768 to 49152. Later, we will mention the modifications necessary to use the RAMPACK in the EXROM bank of the TS 2068.

As you know, TIMEX made the TS2068 bus such that when the slot of the bus is aligned with bus slot of the ZX81 bus, basically the same type of signals appear on both buses. In the case where a corresponding signal did not exist, the pin on the bus was left without any connection. This way, the connection of ZX81 peripherals to the TS2068 bus will, generally speaking, not damage the computer. To highlight the correspondences of the buses, Fig. 1 shows the two buses with the slots aligned.

Our goal of interfacing the RAMPACK to TS2068 can be achieved by directly connecting all corresponding pins on the two buses. The only connection which is not completed is the A14 address line. The reason for that becomes obvious when one thinks about the way the ZX81 RAMPACK is selected when connected to the ZX81. The RAMPACK on a ZX81 gets selected when A14 goes high. In other words, in order to use the RAMPACK successfully in a TS2068 bank, then the A14 pin of the RAMPACK should be logic 1 when the appropriate bank is selected. The appropriate address range conditions (MREQ, RD or WR, and the lower address bits) must also be met on the bus.

Our objective was to map the RAMPACK to an address starting at 32768 in the DOCK bank. In the TS2068, when the DOCK bank is active, the condition is indicated by logic "0" on the ROSCS pin of the TS2068. To map in the range above 32768 requires that A15=1. Another restriction in the design is to be able to select either the lower 8k or upper 8k of the 16K RAMPACK as well as the whole 16K, under software control. The condition on address lines A13, and A14 for such a selection capability is shown in Table 1.

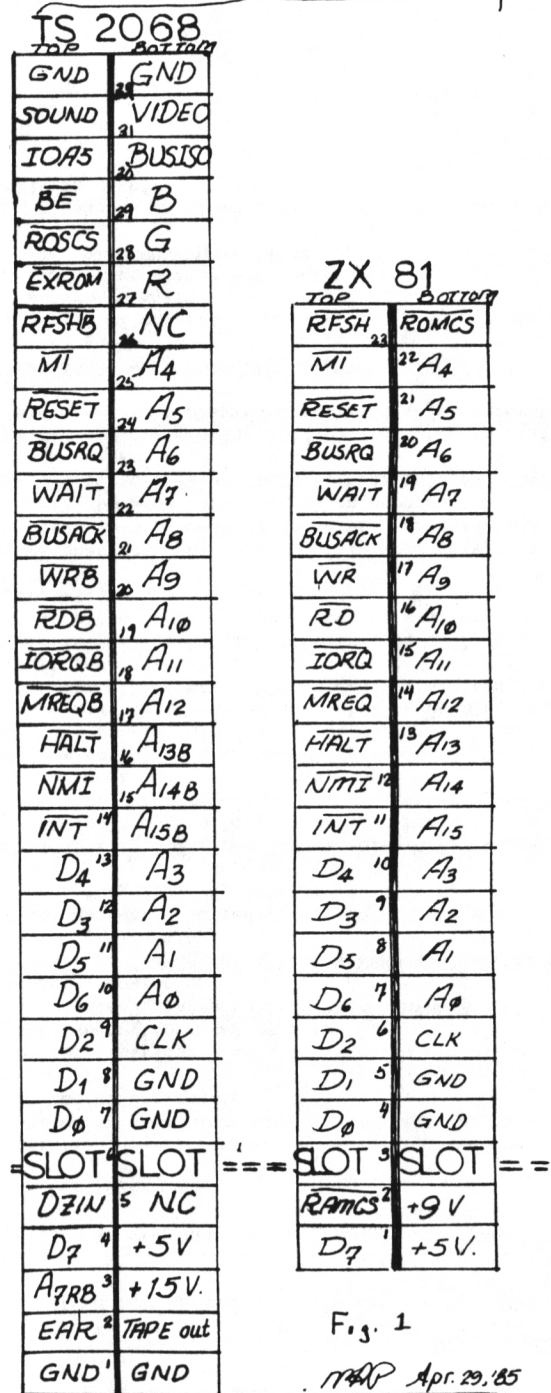
$$A_{15} = 1, \overline{ROSCS} = \phi$$

A <sub>14</sub>	A <sub>13</sub>	SELECT
$\phi$	$\phi$	32K to 40K
$\phi$	1	40K to 48K

TABLE 1

The circuit which achieves the desired result is shown in fig. 2. The output of the decoder selects memory in chunks of 8K. The two diodes provide the capability to switch - in the whole 16K. For the RAMPACK to work properly, there is the need for 9v power. Since the DC voltage supplied from the powerpack of the TS2068 is too high (20-22V under no load) it cannot be used with the RAMPACK. Fig 2b shows a regulator for this purpose. A 9v regulator is shown. It was found that 9v regulators are hard to come by. Tests showed that 8v regulator also worked properly. It is essential that you use at least a clip-on type of heat sink on the regulator; otherwise, you will have thermal shut down, at best,

## TS2068-LIKE BUSES



and at worst..... The temperature with a clip-on type of heat sink will rise to approximately 80° C, which means a burning sensation. It does operate safely without thermal shutdowns, and under continuous use.

To switch the first 8k of the RAMPACK starting from 32768 use: OUT 244,16

To switch-in the whole 16K starting from address 32768 use: OUT 244,48

To switch-in the upper 8k of the RAMPACK from address 40960 use: OUT 244,32

Let's assume that you've switched in the entire 16K. To test it, enter (in the immediate mode):

POKE 32768,99

POKE 49151,99

Now,

PRINT PEEK 32768,PEEK 49151

You should see a pair of 99's on the screen.

Next,

OUT 244,0

This returns you to the home bank. Try the PEEK's now. If all is working, those 99's are gone.

Return to the Dock bank with:

OUT 244,48

and repeat the PEEK's.

Do note that, as the Dock RAM is not initialized, it will contain garbage, at first. You can write your own initialization routine(FOR i=32768 TO 49151: POKE i,0:NEXT i), or use the ROM routine (NEW). Also, if you PEEK memory locations & read the decimal number 14, your RAMPACK is not properly connected.

One application for the extra memory is as development tool in writing AROS software. You can write your BASIC (and/or MC) program as usual, though you may only use a total of 16K for program, MC and variables. It can then be moved into the DOCK bank of 16K, either using the function dispatcher or your own software. Don't forget to add those first few bytes which indicate AROS (or LROS) software. Your program can then be executed from the DOCK, just as if it were on EPROM, but without the time and expense of making one. Once completely "bug free" you could download to a cartridge; like John Oligers EPROM BOARD. We'll be analyzing other ZX81 peripherals for compatibility with the TS 2068, using bank switching, in the months ahead and plan to produce an expanded version of the chart shown as Table 2. The items marked A1 in Table 2 are those which can be made to work with this adaptor.

We used a Zebra joystick adaptor, stripped of its on-board parts and heavily modified as the basis of our adaptor, but other hardware is also suitable. Examples are, a computer Continuum edge board, Maplin boards, Hobbyboard boxes and even a Hunter board. These all require modification, as well.

There are many other potential uses for the 16 RAMPACK in this DOCK mode. Some include communications and/or printer buffer, data storage, games screens etc. If you have a good suggestion why not send it in to this publication and/or LIST.

Finally, the RAMPACK can be operated in the EXROM bank by disconnecting the ROSCS signal from pin 4 of the LS138 decoder. Instead connect the EXROM signal from the TS2068 bus to the same pin. To write-protect the RAMPACK break the direct connection of the WR signal between the computer and the RAMPACK, install a switch, and pull up the WR signal to 5v using a 10K resistor on the RAMPACK side of the switch.

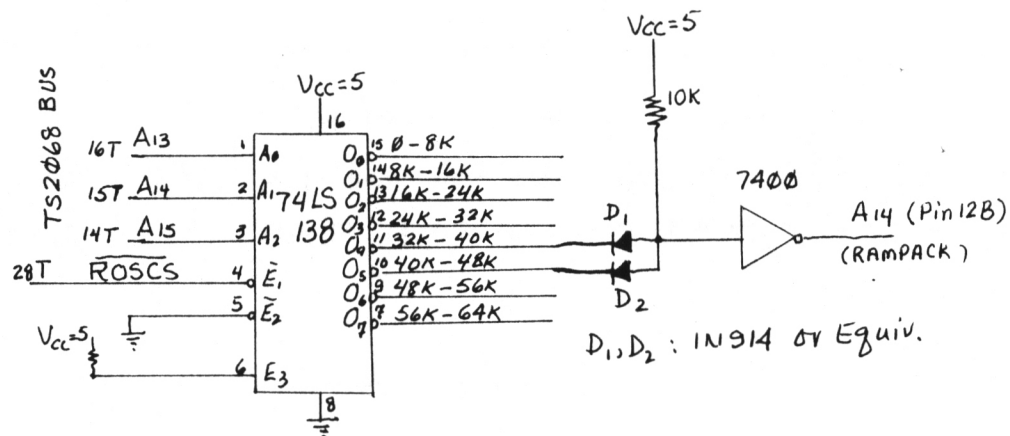


Fig. 2(a)

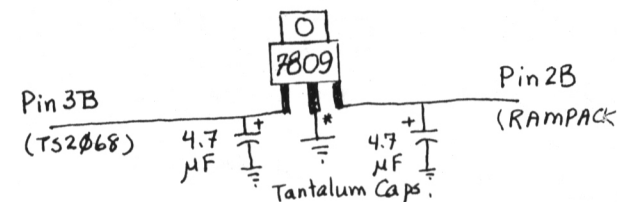


Fig. 2(b)

A15 = 1, ROSCS = 0

A14	A13	SELECT
0	0	32K to 40K
0	1	40K to 48K

Table 1

List  
Group

# HARDWARE COMPATABILITY CHART

	TS 1000 ZX81	TS 1500	TS 2068	SPECTRUM	TC 2068	COMMENTS	TS 1000	TS 1500	TS 2068	ZX SPECTRUM	TC 2068	COMMENT
ZX PRINTER OR TIMEX 2040 OR ALPHACOM 32	X	X	X	X	T		BYTE BACK MODEM #1	X	T	A4		Memory
16K RAM PACK	X	X(adds 16)	A1	A2		32K On for 1500 & Spectrum	#2068 - MID	A4	X	T3		I/O
COMMAND CARTRIDGE ADAPTER	X	X					COMPUTER CONTIN- UUM NOT REBOARD	X	T	A1		
HUNTER BOARD	X	T	A1			8-16K	ENER-Z BOARD	X	T	A1-T		
TS2050 MODEM	X	T	X			I/O Mapped						
ZX MICRO DRIVE			A3	X		ROMCS						
ZEBRA JOYSTICK ADAPTER	X	X	X	X		I/O Mapped (IN31) (etal)						
PARROT VOICE	X	X	X	X3(T)	?	(Needs 9V) (67) (etal)						
ZEBRA GRAPHICS TABLET	T	T	X	X3(4T)		" (OT015)						
KEMPSTON JOYSTICK	T	T	X	X		" (IN31) (etal)						
DK'TRONICS LIGHT PEN	T	T	T	X	T							
ZEBRA LIGHT PEN	X	T										
WINKY 2000	T	T	X	X								
BYTE BACK BB-1	X											

The chart above is based on personal observation. If you know of other items and their status please let LIST know, and we will post your observation.

key - T = Theoretically useable - not tested  
X = Buss compatible (software may be required)  
A) = Adaptable see notes:  
A1 - use bank switching and Zebra board  
A2 - use Stephen Adams boards - 16K Spectrum only  
A3 - needs OMNI-EMU or equivalent  
A4 - Internal adaption possible  
X3 - (adapted 2068)

Table 2

TS 1000	TS 1500	TS 2068	SPECTRUM	TC 2068	COMMENTS	TS 1000	TS 1500	TS 2068	SPECTRUM	TC 2068	COMMENT
BYTE BACK MODEM	X	T	A4		Memory	BYTE BACK MODEM	X	T	A4		Memory
#2068 - MID	A4	X	T3		I/O	#2068 - MID	A4	X	T3		I/O
COMPUTER CONTIN- UUM NOT REBOARD	X	T	A1			COMPUTER CONTIN- UUM NOT REBOARD	X	T	A1		
ENER-Z BOARD	X	T	A1-T			ENER-Z BOARD	X	T	A1-T		

Fig. 1

Subject

Chuck Decoding - 752068

Engineering Chart Sheets

TO ENABLE CHUNKS - OUT 244, N  
where N is a decimal value.

HATCHES  
NOTES

Sheet No. of  
File  
App.  
Date 5/10/85  
By

7 6 5 4 3 2 1 0

HEX

DECIMAL

Memory

chunk# 7 6 5 4 3 2 1 0

EXAMPLE: TO ENABLE 32 TO 48K (chunks 4,5)

OUT 244, 48

7 6 5 4 3 2 1 0

HEX

DECIMAL

Memory

chunk# 7 6 5 4 3 2 1 0

56 48 40 32 24 16 8 0  
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓  
64 56 48 40 32 24 16 8  
N

More on Bank switching next month.  
We'll have some simple demo programs  
and photos of the actual board to  
help in constructing your own B.S.  
interface.



\*\*\*\*\*  
ON LOADING WAVEFORMS AND LEVELS  
\*\*\*\*\*

by Cedric R. Bastiaans

INTRODUCTION

Maybe I should start off by introducing myself properly. After all, I am a new member of the LIST users group, having just recently moved here from Southern California, and you don't know me...

I am a retired engineering scientist with 34 years of research and development experience in telecommunications, audio, acoustics, materials, phonograph disk and magnetic recording. I received my education in the Netherlands, where from 1957 to 1963 I happened to be Manager of the Electro-Mechanical Lab of Philips Phonographic Industries in Baarn, the birthplace of the Compact Cassette as we know it now.

I have been involved in High-Speed Magnetic Tape Duplicating (5 patents), Thin Film Magnetic Data Heads and Hard Magnetic Disks.

In addition to my 3 degrees, I also am a Fellow of the Audio Engineering Society.

I am a relative newcomer to Computers and see myself as a computer-USER, not a hacker or programmer. Machine Code is a total mystery to me and Computerese turns me off.

So much for the preliminaries, on with the subject matter at hand. I would like to share some of the experiences I had with software cassettes for the ZX81 and the TS2068 with you. I hope that you will like what you read and see...Please tell me if you do, but also if you don't!!

ZX81

Of course everything I write about the ZX81, holds true for the TS1000 and TS1500.

Let's first look at LOADING WAVEFORMS. In my experiments I used a RadioShack CCR-81 computer cassette recorder and a Tektronix 7904 oscilloscope equipped with a Polaroid camera, together with my customized ZX81.

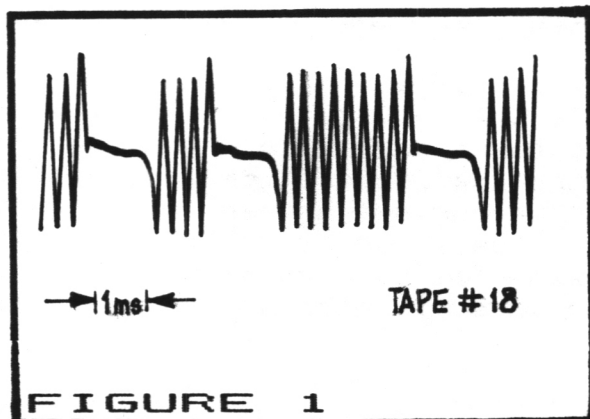


Fig.1 shows a waveform of near-ideal quality. All oscillograms in this article are carefully traced in India ink from original Polaroid photographs. Such tracings just reproduce better than the Polaroids, which are, however, available to anyone who wants to see them. Please note the trains of 4 and 9 pulses, depicting respectively a "zero" and a "one". The pulse period is 0.3 ms (millisecond) and thusly the signal frequency is 3333 Hz (hertz).

Furthermore it follows that the duration of a "zero"-train is 0.9 ms and for a "one"-train 2.4 ms. The silent interval which separates the trains is 1.65 ms long.

Magnetic tape playback benefits from the best obtainable S/N ratio (signal to noise ratio), which is another way of saying that we should strive for the HIGHEST RECORDED SIGNAL level (without undue distortion or magnetic saturation of the tape), combined with the LOWEST NOISE level obtainable.

A typical S/N ratio for cassette recordings is 52 dB (decibel).

A decibel is a unit for voltage, current or power ratios and 1 dB is considered to be the smallest signal change that the human ear can discern. Mathematically, the decibel is computed by taking the logarithm (base 10) of the ratio and multiplying this by 20 for voltage and current ratios and by 10 if we're working with powerlevels. The decibel number will therefore be positive when the ratio is larger than 1 and negative when it is smaller than 1.

Thusly, a S/N ratio of 52 dB means that the signal level is 400 times stronger than the noise level.

In order to avoid driving the tape to saturation and keep distortion at an acceptable level, the recording industry has established socalled STANDARD REFERENCE LEVELS, which are different for the various tape formats.

For cassette tape, this standard reference level is 250 nWb/m (nanoweber per metre, a unit of magnetic flux).

There are professional tapes available (quite expensive, because of their required accuracy), which have a standard reference recorded on them of 315 Hz or 333 Hz, often across the entire tape width, at the required level of 250 nWb/m.

Next item I pondered on was, what instrument to use to measure the level of our ZX81 LOAD signal?

The nature of this signal is not too far removed from that of speech and music, even though nobody would ever call the screeching sound from a ZX-cassette musical!!

So why not use a VU meter, the trusted level meter used in the recording industry? VU stands for Volume Unit and the industry uses standardized instruments, the electrical and mechanical characteristics of which have been laid down in stringent standards. The meter has two scales, a VU scale marked 0 at about 71% deflection, extending to +3 (maximum) and -20 (minimum) and a percentage scale with 100% corresponding with 0 VU reading, calibrated downwards to 0%. The VU scale is logarithmic and the scale divisions follow a decibel calibration.

One of the important characteristics of a professional VU meter is a mechanical integration time of 300 ms. I will not go into details on this; suffice it to say that I have not found any of the socalled VU meters on HiFi cassette decks to have the characteristics required AND THEY ARE THEREFORE NOT SUITABLE for the proper measurement of the ZX LOAD signal; they would probably erroneously indicate overly high levels. If you desire to duplicate my experiments, you have to acquire a professional VU meter. A meter with a VU scale need not necessarily be a VU meter!

For the benefit of this article I went another, more elaborate way, because I wanted to show you graphic records of levels, measured on 23 ZX cassette tapes, 22 of which were purchased commercial software.

The output of my CCR-81 cassette deck was connected to both the Tektronix 7904 oscilloscope and a Fluke 8920A true RMS digital voltmeter with a logarithmic analog output. The latter was then connected to a Hewlett Packard 7015B graphic X/Y level recorder, which

would thusly give me a permanent record of the measured cassette signal levels.

The volume control of the cassette deck was of course adjusted for maximum playback level of my Standard Reference tape, without clipping. For those of you with a CCR-81: this volume setting is at "4". For a RadioShack Minisetete-9, the volume setting is "6" to play 315 Hz, 250 nWb/m without clipping.

The result of this experiment can be found in Figure 7 on the next page.

The tapes are numbered 1 through 23. If they would have been MUSIC tapes, their levels would have been around the -8 dB level, 0 dB being the Reference level of 250 nWb/m. The -8 dB level corresponds to a magnetic flux of 100 nWb/m, the industry's STANDARD OPERATING LEVEL. When the RMS (root mean square) signal levels of music and speech fluctuate around this level, few of their maximum peaks would reach the REFERENCE level of 250 nWb/m and distortion is thusly kept under control. If you have understood the foregoing, you have also gotten a little insight in the dynamics of music and speech.

Now notice that the majority of the 23 cassette software tapes show their signal level to be around the OPERATING level, as if they were indeed music tapes! This proves the use of a VU meter to be a viable method!

All the tapes LOAD correctly, with the exception of tape #17 which does not LOAD at all, and tapes #18 and #20, which are balky. FROM THIS WE CONCLUDE THAT THE RECORDED LEVEL OF ZX81 CASSETTE SOFTWARE SHOULD NOT BE LESS THAN -12.5 dB REFERENCED TO 250 nWb/m FLUXLEVEL, in order for LOADING to take effect. It is gratifying to see that the TIMEX tapes were all of the proper signal strength!

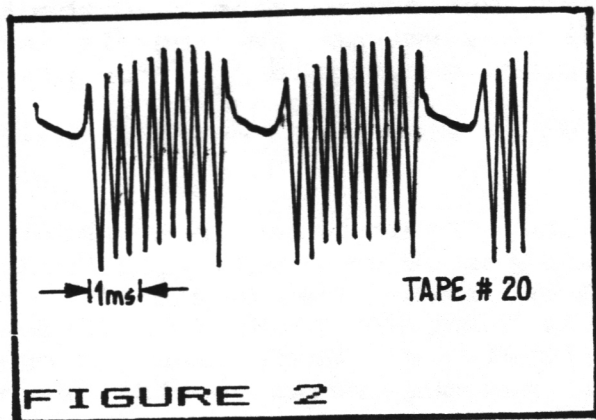
LET IT BE KNOWN THAT THE UNLOADABLE OR BALKY TAPES COULD NOT BE MADE TO LOAD BY ADJUSTING THE HEAD AZIMUTH ALIGNMENT! This is a technique that at times may have its merits, but should in general be resorted to as a final (desperate) solution for a LOADING problem. I am not afraid to go on record for saying that it is a very UNDESIRABLE technique; the head mounting of our little cassette decks is mechanically not made to cope with constant adjustment (contrary to the profesionnal tape decks used in studios and such). All you do is make the head alignment of your machine match the lousy alignment of the software supplier's dubbing machine. And pretty soon you just don't know where your tape head alignment really is at!

If you HAVE to tweak your head, limit this technique to just one deck and keep another deck untouched as far as its head azimuth alignment is concerned.

What you might want to try next time you have a LOADING problem and you're certain that the level is not to blame, push down on the cassette, either on the left top corner of its case or on the right, WHILE IT IS PLAYING. If this leads to a succesful LOAD, you know that the problem was head mis-alignment and you did not even have to tweak! You see, what happens when you push down on the corner of the case is, you COCK it a little bit, causing the tape to pass the head at a slightly different angle than normal, which is equivalent to an azimuth change.

Unfortunately, this technique is not feasible with decks like the Minisetete-9, where the cassette is not accessible during operation.

The system is quite tolerant; it appears that any train is allowed to have one additional pulse without any loading problems. In other words, a "zero"-train may have 4 or 5 pulses and a "one"-train 9 or 10. You see this for instance in Fig.2.



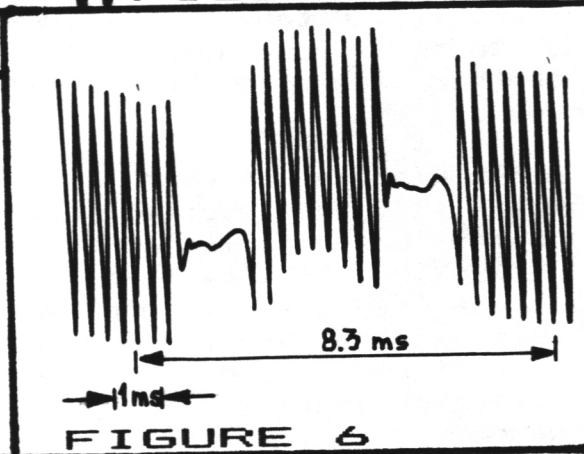
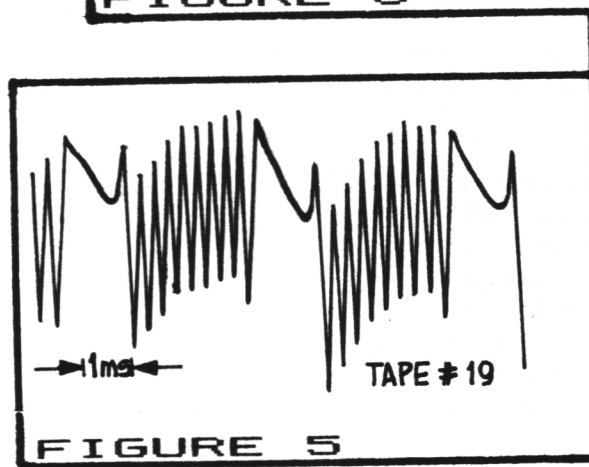
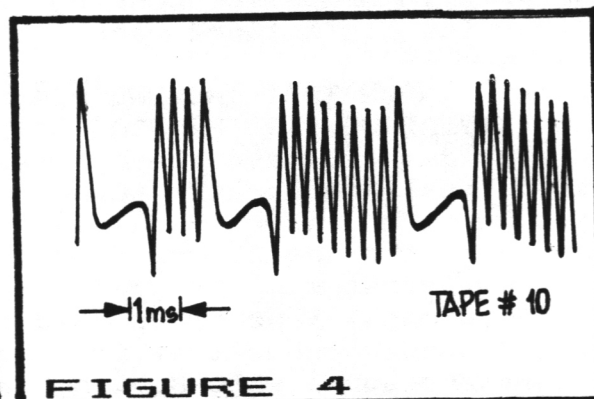
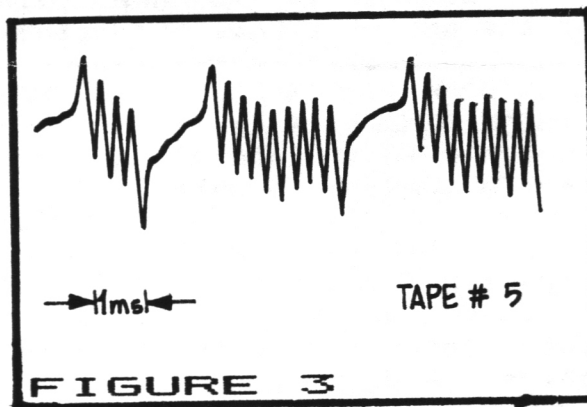
Note also the asymmetry of the waveform. None of this appears to affect proper LOADING and it is therefore to be expected that PHASE would not matter either. I checked this with a special cable on several cassette tapes and they all LOADED without a hitch, no matter whether the LOAD signal was IN or OUT OF PHASE! This was very encouraging. What about severe waveform asymmetry? Or superimposed hum?

Would these kinds of distortion be detrimental to succesful LOADING?

The answer, after a good deal of waveform watching, is NO!!

Figures 3 through 6 are oscillograms of tapes which all LOADED succesfully, in spite of their sometimes atrociously asymmetric and distorted signals.

Fig.6 is an example of 120 Hz hum recorded with the pulse signal. No problem here either!



Why is it then, that we have so much trouble with LOADING our computers? I believe that the major problem lies in the RECORDED SIGNAL LEVEL.



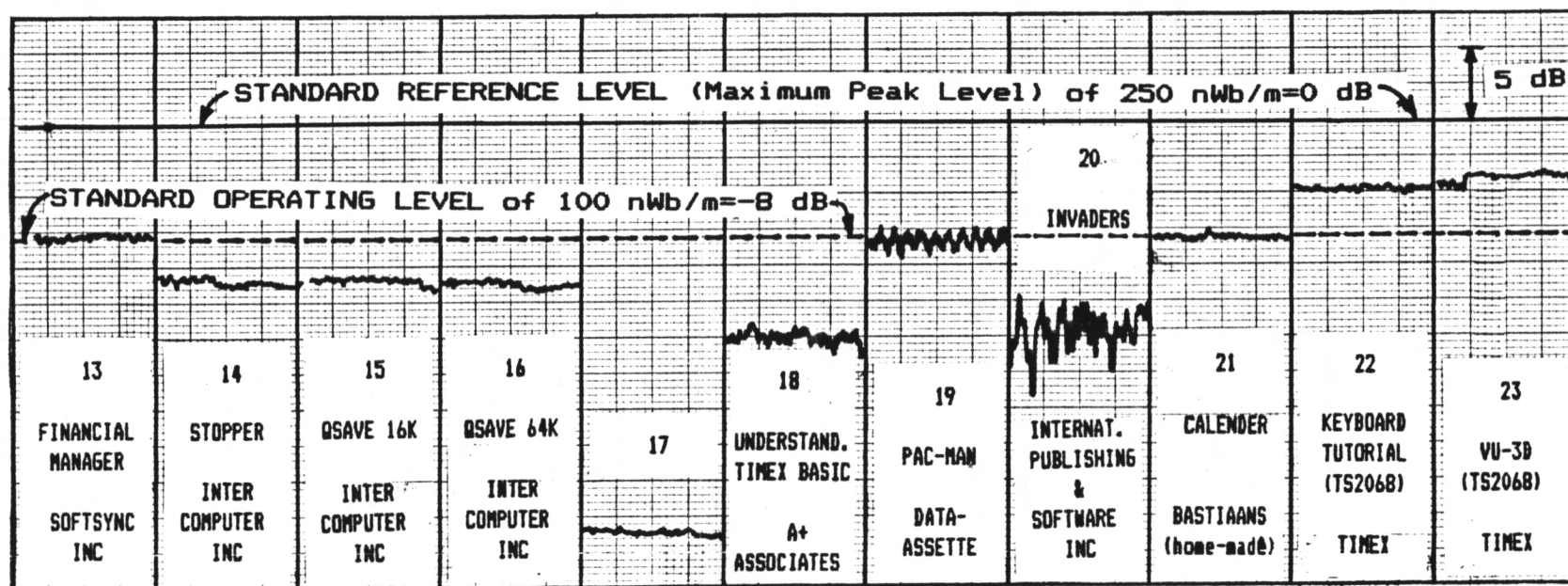
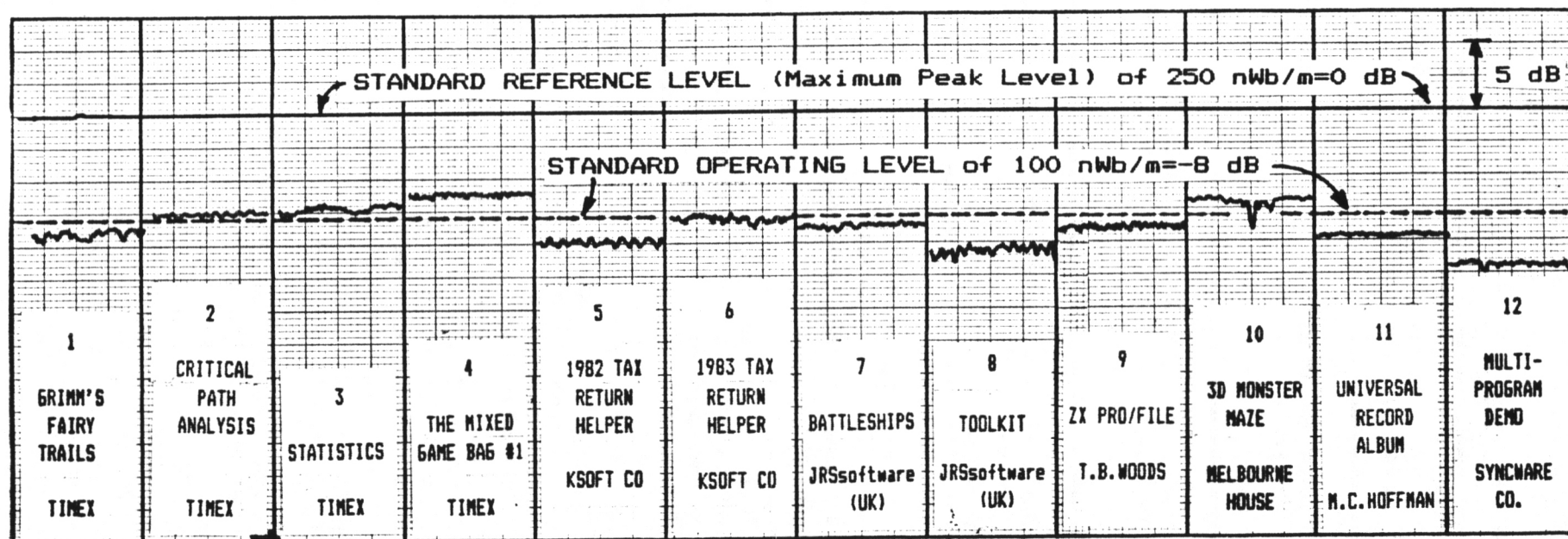


FIGURE 7

The space available for this article is simply not enough to give all the reasons, why head azimuth adjustment by the non-professionals or un-initiated, devoid of complete knowledge and proper tools as they are, is such a bad idea. Maybe I will write a separate article on this subject. Meanwhile, let's be grateful that the gods smilingly look with compassionate pity upon the daring ignoramuses among us ...

Anyway, the preceding has shown us that ZX81 software tapes should be recorded at or close to an RMS level of 100 nWb/m.

Now that we have looked at the desirable RECORDED levels of cassette software, the question arises: at what level should these tapes be PLAYED so that they will LOAD?

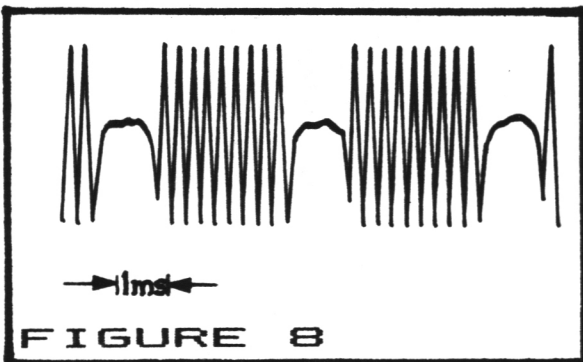
I have found the INPUT to the EAR-jack of the ZX81/TS1000/1500 to require a 5 V peak-to-peak (PTP) level in order to consistently load successfully.

Few of us are in a position to measure this or are otherwise able to adjust the playback volume to this level.

Suitable electronic circuits have appeared in various publications. There are also a variety of gadgets on the market that may or may not do the job.

I hope to show you in a later article, how to build a simple circuit, which will enable you to adjust the playback level of your ZX81, TS2068 or Spectrum cassette tapes for the proper LOADING level.

The use of FILTERS and/or PULSE SHAPERS is a good idea. One of the very best I know is the unit that comes with the QSAVE fast loading software. Unfortunately, there are at least two versions of this QSAVE filter that I know of, maybe even three and neither their circuitry nor their performance is the same! The one I have, uses a built-in 9 V battery, if that is a clue at all and it just may be their most recent version (1983). It has a simple band-pass filter with knees at 800 and 8000 Hz and slopes of 6 dB/octave. The output level, however, is not sufficiently high; on one unit it was a constant 3.75 V PTP, on another it was 4 V PTP. I modified my unit to provide a constant 5 V PTP. It is quite difficult to open the QSAVE box and leave it still intact, but to those of you ready to improve their unit, the thing to do is replace the feedback resistor with a 300 kilohm value and the 120 pF capacitor across it, with three 27 pF capacitors in parallel. If you find that this instruction does not make sense for your unit, you most probably have a different QSAVE filter version. Please understand that I cannot publish the circuit of my unit, without getting into hot water with the manufacturers of QSAVE!



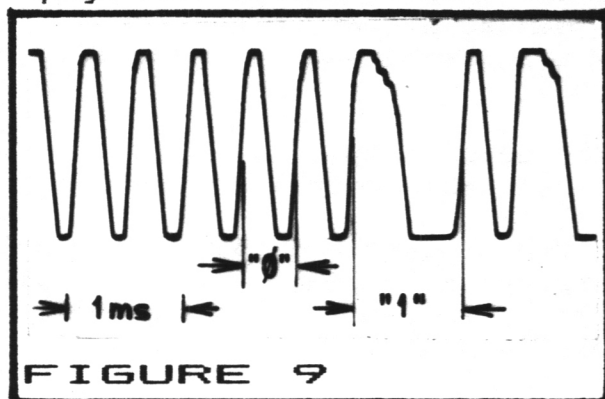
The oscillogram on the left shows what this modified filter is capable of. The tape with the superimposed 120 Hz hum (Fig.6), fed into the filter unit, produced the clean waveform shown in Fig. 8. The unit invariably adds an additional half-pulse to the trains of 4 and 9 pulses; as I have noted before, this does not matter.

Again, let's start with a look at LOADING WAVEFORMS.

I used a different model oscilloscope this time, a Tektronix 2235. Also, in addition to the CCR-81 cassette recorder, I used a RadioShack Minisette-9.

There is quite a difference in the performance of these cassette decks. These are NOT important for LOADING ZX81 tapes, but they DO make a difference for 2068 tapes. The Minisette-9 has a much better pulse playback performance than the CCR-81, provided you run it with both the volume and the tone controls set at maximum, (position 10). More about this a little later...

The 2068 cassette tape format has been fully described in Section 4.2 (page 110) of the TS 2068 Technical Manual.



It is therefore to be expected that the use of a VU meter to measure RMS levels of 2068 cassette software, would show higher levels than we found with the ZX tapes.

I checked such levels on sixteen 2068 and Spectrum tapes. Instead of the graphic level recordation used for Fig. 7, I will just give you a list of my readings in dB, referenced to 250 nWb/m.

The listing order is in descending dB-values. There are two columns with dB numbers, the first one measured with the Minisette-9, the other with the CCR-81.

1. QUADRA-CHART	(Timex)	+ 1.0 dB	- 1.5 dB
2. TASMAN I/F Software	(Tasman)	+ 1.0 dB	- 0.5 dB
3. Library Tape 1.7 A	(L.I.S.T.)	0 dB	N/A
4. SCRABBLE (Spectrum)	(Psion)	- 0.5 dB	- 3.0 dB
5. KEYBOARD TUTORIAL	(Timex)	- 0.8 dB	- 3.0 dB
6. FUN GOLF	(Timex)	- 1.0 dB	- 3.0 dB
7. VU 3D	(Timex)	- 1.5 dB	- 4.0 dB
8. TASMAN DRIVER	(Woods)	- 1.5 dB	- 1.5 dB
9. A SAVED Program	(Bastiaans)	- 2.0 dB	- 3.0 dB
10. CASINO I	(Timex)	- 2.5 dB	- 5.0 dB
11. CHEQUERED FLAG (Spectrum)	(Psion)	- 3.0 dB	- 5.0 dB
12. PRO/FILE 2068, one copy	(Woods)	- 3.5 dB	- 6.0 dB
13. MSCRIPT for Tasman I/F	(Woods)	- 4.4 dB	- 7.0 dB
14. PRO/FILE 2068, other copy	(Woods)	- 4.5 dB	- 7.0 dB
15. VU-CALC	(Timex)	- 5.0 dB	- 7.0 dB
16. HANDICAP GOLF (Spectrum)	(Comp.Rt.)	- 10.0 dB	<- 10.0 dB

As we expected, the average RMS level is indeed higher than that of the ZX81 software tapes.

Note that the CCR-81 levels are in most cases about 2.5 dB lower than

those measured with the Minisetete-9. It is a natural result of the CCR-81's poorer pulse response.

Of the tapes in the above list, tapes 13, 14 and 15 are balky on the CCR-81. Tape 16 is somewhat difficult to load on the Minisetete and does not load at all with the CCR-81.

It appears to be desirable that 2068 or Spectrum cassette tapes be recorded at an RMS level not less than 4 dB below 250 nWb/m.

IT ALSO APPEARS THAT GOOD PULSE RESPONSE IS A REQUIREMENT FOR SUCCESSFUL LOADING OF 2068 OR SPECTRUM CASSETTE TAPES.

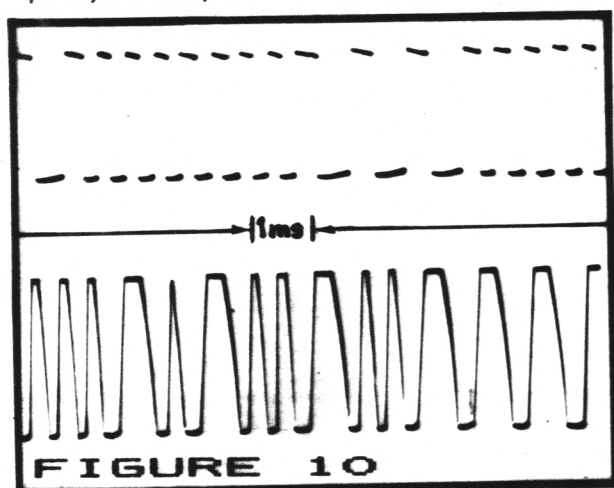
This requirement makes it somewhat difficult to state an optimum playback level, since it is a function of the pulse response of the cassette deck used. The 2068 Technical Manual states in Section 2.4.3 (page 69) that the EAR input voltage should be between 4.0 and 10.0 V PTP.

I do not know of any cassette deck that could supply a 10.0 V PTP playback signal and 4.0 V may only be acceptable with a perfect pulse response.

All I can state at this point is, that the Minisetete-9 is preferable over the CCR-81 for playing 2068 or Spectrum tapes, provided both controls are at maximum. In this condition, it can put out a maximum signal of 4.6 V PTP and you would rarely have a LOADING problem.

The CCR-81 on the other hand, with its poorer pulse response (although more than adequate for ZX81 work), requires to be played at a higher level, typically 6.0 V PTP. It has no tone control and its maximum output level is 6.4 V PTP. Most good tapes will LOAD successfully with its volume control set at "7".

All that remains is to show you the dramatic difference in pulse playback performance of the two cassette decks discussed.



The two oscillograms on the left are of the very same tape, of practically the same program portion. The UPPER one is by the Minisetete-9, the LOWER one is from the CCR-81.

The Minisetete oscillogram shows no traces joining the positive and negative period halves; this points to what we call a "fast response".

The CCR-81 signal, however, clearly shows such joining traces, indicating a poorer pulse response.

At this point I should like to refer you to the writings of Fred Nachbaur in SyncWare News. If you're up to some cutting, soldering and replacing of components inside your computers, he's got some good tips.

It is my sincere hope that software suppliers will look into the matter of recorded levels. There is no reason why we, the buyers and users of such cassettes, should have to put up with poorly recorded tapes.



West Covina, Ca. 91790  
June 3, 1985

The English Micro Connection  
15 Kilburn Court  
Newport, RI 02840

Attn: Bob Dyl

Dear Mr. Dyl:

I almost feel like I know you from reading about EMC in the newsletters I get (LIST, QZX, Synapse, Syncware, etc.). Also I sent to England directly for a Robotronics WAFADrive and I believe they sent the check to you and you returned it with the US price of \$229. Your Damco Co. I believe?

I didn't reorder as I have been debating Microdrives vs WAFADrives vs some disk system. I use two 2068's one at home and one at work so could use two systems, one economical and one cheap. Ha!

Now I'll tell you what I have and ask for a quote. I have the two 2068 computers with:

1. A Z-Link "Spectrum" edge connector adaptor.
2. Doug Dewey EMU-1 (the first \$60 one).
3. The low profile socket 10k pull-up resistor mod under the Exrom. (Syncware news).
4. The Ray Kingsley "pseudo EXrom" Bug fix. (Apparently necessary to fully use bank switching as intended).
5. John Oliver expansion board and eeprom maker.

What more do I need to run the Sinclair Microdrives? Is there any advantage to the WAFADrive, other than using the A & J wafers which are more available here. Send me a quote for either and put me down to be advised when the Portugal disk is available. Send any catalog or leaflet.

I have TASHAN Serial and Parallel Interfaces and can print on Brother EP-44 or Mannesmann-Tally Spirit 80. This letter is with EP-44 which has the best letter quality I have seen in any dot-matrix at any price. (I need to fix left-margin "slip").

Sincerely,

BOB HOWARD, WA6DLI

P.S. You can see my at work pix on "2068 Profile" book cover by Tom Woods.

Paul -  
This is a follow-up to  
the letter I wrote published  
in LIST - wherein I sent  
to England for a WAFADrive  
The Co. returned my check  
to Damco - they returned it  
with the "US" price of \$229

Bob Howard.

WA6DLI

## LETTERS

List  
Group



### How "letters" work - A Bootstrap

We receive dozens of requests for information each month. Some are general in nature, but most ask us specific questions about hardware, software, and compatibility.

Since we don't (and can't) have all the different types of HW & SW available, your editorial staff simply can't answer all the questions raised. We try, e.g., by sending pages from back issues of LISTing or referring the questions to another source of information, but we need your help.

If you see a question in the letters section, and you know the answer, please send the answer to LISTing and/or the individual. If you send it to us, we'll publish it and pass it on.

Oh yes, we don't print members street addresses unless told specifically to do so.

This month we'll be showing you system descriptions from Bob Howard and Richard Cunningham. Their layouts and comments will probably strike a chord with many of us.

L.I. SINCLAIR TIMEY GROUP  
PAUL DENNY,  
CENTREPORT,  
NY 11721  
USA



August

8/85

15

T.S. SERVICES  
P. O. Box 15214  
Red Bank, TN. 37415-0214  
(615) 877-6327

# LISTing

Centerport, NY. 11721

Timex Sinclair Editor,

In an attempt to provide a information service to members o our National TS Users' Network (NTSUN) and other TS users, we have started project TS ARTICLES. The purpose of TS Articles is to prepare listings all informative articles, programs and other items of interest published in the USA and Canada newsletters and magazines on Timex & Sinclair subjects. The listing would be restrictive to those publication which provide back-issues to requesting parties or Xerox copies of publication in our files.

Since you are a publisher of newsletter or magazine we are requesting you support in this project. Payment would be in the form of a free listings for this service. If you wish to sell back-issues indicate the retail price per issue and we refer inquires to the above address.

We request you send a copy of all the articles, programs, etc published in your newsletter and/or legible sample copies of all back issues.

We at TSS will direct inquires to your address for back issues at your published rate or provide a Xerox copy of the copy you provide. If your publication contains a copyright statement please include authorization to reproduce the issues you provide.

We believe this services will not only provide a valuable source of information but will also help with your sales of your products.

Members - should we do this?

Awaiting Your Reply,  
Don Barnard  
Manager, NTSUN

L.I. SINCLAIR TIMEX  
GROUP  
PAUL DONNELLY,  
CENTREPORT,  
NY 11721

PUNTA INDIO, 29 de mayo de 1985.-

Dear Sirs:

I would be grateful if you could send me information about Software and/or hardware peripherals for the Timex Sinclair 2068.-

Also I would like to know if there is any T/S cartridge that can be connected to the T/S 2068 so one can use Software of the Sinclair ZX Spectrum.-

If it is so, how can I get it, and its price/vendor/manufacture.

Thanking you anticipation I remain very truly yours.-  
Hector,

Sample pages from LISTing have been sent.

PN

HECTOR JORGE PICONE  
CAPITAN DE CORBETA  
INGENIERO AERONAUTICO  
ARSENAL AERONAUTICO N°1  
1919-BASE AERONAUTICA PUNTA INDIO

Centerport, NY 11721

Hello; 6/1/85

I'm a Mechanical Design Engineer & Computer Programmer. My background includes high-technology assignments with E. I. DuPont, IBM, Western Electric, etc.

I have written many programs for the Timex/Sinclair 2068, plus the T/S 1500 & T/S 1000 (ZX 81) in "Engineering", "Mathematics", "Games", etc.

Some of These are:

ENG/MATH 150/ 2068 1000

■ Belt & Chain Drives" Yes Yes I would appreciate a newsletter Gives 9 important answers fast. & being placed on your mail list

TS 2068 programs include subject graphics & colors. Some TS 1000/1500 Programs contain graphics.

PRICES:	2068	1500/1000
Each Program	\$9.95	\$6.95

Thank You,

FRANK LOCKHART  
P. O. Box 4095  
Ormond Beach, Florida  
Zip 32075-4095

(904) 255-2514 - Ext.132 (Res)

3382 Ridgeway Rd.  
Lex, Ky. 40513  
May 21, 1985

List Associates

Centerport, N.Y. 11721

Dear Paul D. or Sir

I would like to know if the Discount Disk Drive in Your Computer, May 21, P.36 will work, if so please tell me or if not, please tell me how I could interface it to my computer. I would like to know if Zebra or any manufacture makes a interface to the ZX Spectrum's interface #1 & micro drive. I also want to know how I order FROM Britain. I thank you for letter is neat. I would like another one. My phone number is (606) 223-9000. Also my Dad wants to know how you can order "ADVANCE GRAPHICS MANUAL" for the TS 2068.

Thanks:  
Master, Will Young

P.S. My computer is the TS 2068 (For the Disk Drive).

Will:

I don't have that issue of TC, but can give this advice: Most Disk Drives, per se, can be interfaced to the 2068, if you can find the right interface. So far we've found only the Timex (Portugal only) to work with the 2068 (Spectrum-48) and the Zebra (Portugal only) to work with the 2068. The Zebra and the Timex should work with the 2068, and the Zebra and the Timex should work with the 2068.

Both Beta and SP-DOS systems do not work with 2068's, this is because they use code which activates some of the 2068's extra hardware - when you don't want it.

Zebra is making a universal interface, I have seen the prototype. It will have on board Spectrum ROM, TS 2068 ROM, Spectrum 48 ROM, and a Zebra ROM. It will be a Zebra ROM. You can get interfaces from English Micro Connection and Doug Henry, as well as build your own using schematics found in back issues of LISTing. I recommend waiting for the Zebra board, but if you can't, the others are O.K. With the Zebra and an emulator (unless it's built in), you can run the micro-drives. I have the special "package" on these (4 cartridges with software, 1 drive and I.F. one) for which I paid \$120. (It's slightly higher now) and I'm quite happy with the system. Where to order from (in U.K.):

See addresses on the vendor page. I recommend National Software Library, Thoughts & Crosses and Speedysoft, in that order.

Sorry, we can't give out more than one gratis copy of LISTing. We're not-for-profit, but we're not-for-loss either. More sample pages are attached though.

Paul D

## EWL Company

### Electronic Circuit Design

Paul Donnelly  
Long Island Sinclair Timex  
P.O. Box 438  
Centerport, NY 11721

209 West Dayton-Village Springs Road, #204  
Fairborn, Ohio 45324  
(513) 878-9664

June 18, 1985

Dear Mr. Donnelly:

Several T/S users have brought it to my attention that many Sinclair user groups would be interested in my circuit of a RS-232 Communication and Interface Port for the ZX81 and TS/1000.

Hands-On Electronics has recently published (Spring 1985 issue #4) my article dealing with such a circuit. It shows you how to add a standard communications interface to the ZX-81. An RS-232 serial communications port that will let you access standard printers, modems, other computers, and more! They give you all the details you need to build the interface and they show you how to control external devices (such as LED's, relays, buzzers and even appliances with a little work, etc.) with software. With the interfaces input capability you'll be able to monitor outside functions (such as temperature, acidity, light intensity, etc.) via transducers.

This interface can also be used with the ZX-80 and details are given. They also show how to use the interface along with the 8K battery backed-up RAM board that was presented in their sister publication, Radio-Electronics, July and August 1983.

If anyone in your group is interested in this circuit or has any questions or would like more information I will be happy to help you/them in any way I can. Please feel free to contact me at any time.

Sincerely,

Edward W. Lorterkamp

Edward W. Lorterkamp

Perhaps this will help Dennis B. and the rest of our budding hardware hackers.

RICHARD J. CUNNINGHAM

5. OZONE PARK, N.Y. 11428

MEMO FROM THE DESK OF:  
RICHARD, J. CUNNINGHAM

JUNE 14, 1985

L.I.S.T.  
PAUL DONNELLY  
P.O. BOX 438  
CENTERPORT, N.Y. 11721-8438

DATE: JUNE 15, 1985

TO: PAUL DONNELLY

RE: PARALLEL PRINTER WITH A & J

DEAR PAUL,

I TOLD YOU ABOUT MY TROUBLES WITH THE A&J MICRODRIVE IN MY LETTER OF MAY 6. WELL I GOT IT BACK YESTERDAY. SIX WEEKS IT TOOK. SLOW, BUT THEY WERE VERY CO-OPERATIVE AND DO STAND BEHIND THEIR PRODUCT. IT TURNED OUT TO BE A DEFECTIVE INTERFACE. ALL SEEMS TO BE WORKING OK NOW AND I SURE HOPE IT CONTINUES THAT WAY. THE MICRO IS CERTAINLY MORE CONVENIENT THAN CASSETTE.

BEFORE LONG I WILL HAVE A BUNDLE OF TIMEX GAME TAPES WHICH I WILL NO LONGER NEED. PERHAPS SOME MEMBER MIGHT BE INTERESTED IN THEM AT A REDICULOUSLY LOW PRICE. THEY CAN CALL ME AT MY HOME ANYTIME (718) 843-9882. I ALSO HAVE ZX-1000 MATERIAL.

PAUL I HAVE NOW PURCHASED ANOTHER COMPUTER. THE SPECTRAVIDEO SU-328. DAK HAS THEM ON SALE FOR \$169 PACKAGED WITH 48 PROGRAMS OF ALL SORTS. TWO JOYSTICKS, ALL CABLES AND THE DATA RECORDER. THE COMPUTER IS MARKED AS 80K AND I GUESS THAT'S ABOUT WHAT IT IS. GREAT GRAPHICS AND EXCELLENT MSX MICROSOFT 1.1 BASIC.

THE PROBLEM IS, OF COURSE, NO SUPPORT. BUT THAT DIDN'T STOP ME WITH TIMEX WHEN THEY PULLED OUT. I'M A SUCKER FOR DISCONTINUED COMPUTERS. MY PROBLEM NOW IS THE SCANTY MANUAL THAT CAME WITH THE COMPUTER. IT TELLS ALMOST NOTHING, NOT EVEN HOW TO SAVE AND LOAD. CAN YOU BELIEVE THAT? STILL I THINK IT IS BETTER THAN THE COMMODORE FOR PROGRAMMING AND FOR GRAPHICS. IT MAY COME BACK IN STYLE WHEN THE JAP MSX MACHINES HIT THE MARKET. ANYONE OUT THERE INTERESTED IN THE SUBJECT???

ANY MEMBER OUT THERE KNOW WHERE I CAN GET THE SU-328 BASIC REFERENCE GUIDE???? I'M WILLING TO PAY IT'S LIST.

STILL WAITING FOR MY MAY ISSUE OF LIST PAUL. YOU STILL HAVE MY ADDRESS. IS IT LATE. OR IS MY MAIL BEING SABOTAGED?

BEST REGARDS,  
*Richard*

DEAR PAUL,

JUST A QUICK NOTE TO LET YOU KNOW I RECEIVED MY MAY LIST TODAY.

I NOTE MENTION THEREIN OF A PARALLEL INTERFACE ATTACHMENT TO BE USED WITH THE A & J MICRODRIVE. I CAN ONLY ASSUME THAT IS FOR PEOPLE WHO DO NOT HAVE TASMAN INTERFACE.

MY 2068 PRESENTLY HAS THE FOLLOWING ITEMS ATTACHED AS FOLLOWS:

A & J MICRODRIVE INTERFACE PLUGGED DIRECTLY INTO THE 2068 PORT.

A SHORT 18 INCH CABLE (OPTIONAL) PLUGGED INTO AJ INTERFACE.

2040 PRINTER ATTACHED TO CABLE AGAIN COULD PLUG DIRECT TO A & J INTERFACE.

TASMAN INTERFACE PLUGGED INTO THE BACK OF THE 2040 PRINTER INTERFACE.

OLIVETTI PR2300 PRINTER PLUGGED INTO TASMAN INTERFACE.

2 A & J MICRODRIVES PLUGGED INTO MICRODRIVE INTERFACE.

CASSETTE DRIVE PLUGGED INTO USUAL CABLE PORTS FOR CASSETTE.

ALL PLUGGED INTO A 6 SOCKET OVERLOAD LINE WITH A SWITCH THAT SHUTS EVERYTHING OFF IN CASE I FORGET.

WITH THIS ARRANGEMENT I CAN USE THE MICRODRIVES AND CASSETTE IN TANDEM TO SAVE AND LOAD BETWEEN THE TWO SYSTEMS. I CAN ALSO USE EITHER PRINTER DEPENDING ON PROGRAM/LINE PRINT NEEDS.

NOW I HAVE ATTACHED MY SU328 COMPUTER, AND IT'S DATA RECORDER TO THE SYSTEM. ALL IS SERVED BY ONE 13" COLOR TV SERVICED BY TWO TV-COMPUTER SWITCHES WIRED BY A JUMP CABLE TO EACH'S ANTENNA TERMINALS. GOT IT??

THE WHOLE SYSTEM ALLOWS ME TO SWITCH BETWEEN COMPUTER SYSTEMS AS WELL WITH JUST THE FLICK OF A SWITCH. GUESS I WILL NEED MORE CABLE WHEN I GET MY WORD PROCESSOR AND PARALLEL INTERFACE (ON ORDER) FOR THE SU328.

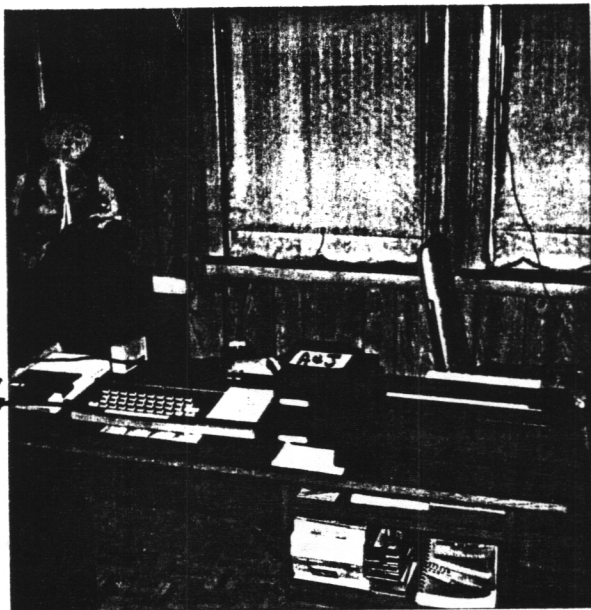
I AM ENCLOSING A FEW PICTURES TO SHOW YOU THE SYSTEM SETUP IN CASE THEY MIGHT INTEREST YOUR MEMBERS AT THE NEXT MEETING. I AM OPEN TO ALL SUGGESTIONS FOR STREAMLINING OF IMPROVING THE SET-UP WHICH IS REALLY A PUT-TOGETHER-AS-YOU-GO ARRANGEMENT.

SO I AM STILL WONDERING WHY I WOULD NEED TO PLUG A PRINTER INTERFACE TO THE TOP OF THE A&J INTERFACE??

ON THE OTHER HAND WHEN I ADD A MODEM OR ANYTHING ELSE I AM GOING TO BE HARD PUT TO FIGURE OUT WHERE TO PLUG IT.

REGARDS,

*Richard*



Is anyone else having trouble getting their issues of LISTING? We don't have a fixed publication date, but generally try to be "on the streets" by the 15th of the month, at the latest. Since LISTING is mailed FIRST CLASS it should arrive within 3 days.

Richard's photo is reproduced here. Looks like he has a very nice setup. The A&J parallel interface not only would save an edge connector, it will be cheaper than AERCO or TASMAN (less than 1/2 the price, last time I looked). I didn't think the SV-328 was a true MSX machine. Can anyone help Richard with his documentation problem?



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# USER GROUP NEWSLETTER EXCHANGE

We exchange LISTing for copies of publications produced by the following organizations and businesses:

Talk to Jeff S. about specific issues/articles. We don't have all issues.

ZXTS  
2304 S Milit. Trail  
Lake Worth  
Forum (40 New Era)  
FL 33406

Time  
29722 Hult Rd.  
Colton  
Designs  
OR 97017

Triangle  
206 James ST  
Carrboro  
Group  
NC 27510

Totonto  
14 Richrome Court  
Scarborough,  
CANADA  
TSUG  
Ontario  
MIK2Y1

WMJ Data  
4 Butterfly Drive  
Hauppauge  
Systems  
NY 11788

Silicon Valley  
Box 4133  
Santa Clara  
S/T User Grp  
CA 95954-0133

Southern Virginia  
Route 1, Box 21  
Glade Hill  
TUN  
VA 24092

T. S.  
2002 Summit ST.  
Portsmouth  
Horizons  
OH 45662

Capitol  
PO BOX 725  
Bladensburg  
TSUG  
MD 20710

TAS BAM  
PO Box 644  
Safety Harbor  
FL 33572

LICA  
PO Box 71  
Hicksville  
The Stack  
NY 11802

SINCUS  
Box 523  
Owego  
NY 13827

Hampton Roads  
17 Rex Ave  
Portsmouth  
TSUG  
VA 23702-2925

## MORE MAIL

Dennis B.  
Yes the "Simple 2068 Out Port"  
in our 12/84 issue should work with the  
TS1000. You need to write your own  
software in Machine code, though.

CCAT/S  
1419 1/2 7th St  
Oregon City  
OR 97045

Computer Trader  
1704 Sam Drive  
Birmingham  
Magazine  
AL 35235

Timex-Sinclair  
3708 Newberry Rd  
Gainesville  
User Group  
FL 32607

SLUG  
4122 Wallingford Ln  
Louisville  
KY 40299

## ALBERTSON COMMUNICATIONS, INC.

DEPARTMENT OF PUBLIC SAFETY COMMUNICATIONS  
225 VALLEY PLACE  
HAWAIIAN ISLANDS  
HONOLULU, HI 96813  
914 698-7787

TSUG  
914 S. Victor Way  
Aurora  
Milehigh  
CO 80012

Cleveland  
6514 Bradley Ave  
Parma  
SUG (down)  
OH 44129

JUNE 28, 1985

FRED NACHBAUR  
COMPARTMENT 12  
MOUNTAIN STATION GROUP BOX  
HELBORN, NC 27543  
CANADA

Abilene  
906 E.N. 18th ST  
Abilene  
TSUG  
TX 79601

NE Florida  
6634 Oriole Ave.  
Jacksonville  
TSUG  
FL 32216

DEAR FRED,

HAVE RECEIVED YOUR REPLY OF JUNE 12, 1985. THANK YOU  
I WOULD LIKE TO MENTION AGAIN...BY REMOVING R11 AT THE INPUT TO  
THE LOAD...THIS SOLVED ALL LOADING PROBLEMS...ALL OF THE 2068'S  
I HAVE TRIED...THAT HAD PROBLEMS IN THE PASTLOAD 1985'S ALL DAY  
LONG...

THIS WOULD SEEM TO BE A FAR SIMPLER SOLUTION TO ANYTHING I HAVE  
HEARD OF IN THE PAST...

INCIDENTALLY...TRIED TO GET A COPY OF THE TECH MANUAL FOR THE 2068  
AND AM TOLD IT IS NOW OUT OF PRINT (FROM T/S CONNECTION IN  
CINCINNATI OH) WAITING FOR A REPLY FROM TIMEX AT LITTLE ROCK...

THANKS AGAIN FOR YOUR PATIENCE WITH THE LINES OF ME...

SINCERELY YOURS,

STAN HASBRO

DEAR PAUL,

JUST RECEIVED THE CURRENT ISSUE OF L.I.S.T.ING

I NOTE YOUR REPLY TO MY LETTER IN THIS ISSUE AND THANK YOU...

ALSO I NOTICE SOME ONE ELSE HAD ASKED ABOUT THE "HEADER" PROGRAM  
I AM INTERESTED IN...AND WAS TOLD TO LOOK TO A BACK ISSUE OF L.I.  
S.T.ING...

I HAVE ASKED BEFORE HOW I MIGHT OBTAIN BACK ISSUES, BUT HAVE NOT  
RECEIVED A REPLY...ALSO IN THE CURRENT ISSUE I NOTE THE CASSETTE  
PROGRAMS BEING DISTRIBUTED HAVE THIS "HEADER" PROGRAM...IS THERE  
ANY WAY I CAN PAY SOME ONE FOR A COPY OF SAME??

ALSO ATTACHED PLEASE NOTE THE "TAB-SHINNA" USE OF TABRAN  
INTERFACE THAT WAS NOT INCLUDED IN MY PREVIOUS LETTER...USED WITH  
A SPIRIT OF PRINTER IT PRINTS OUTS FULL OF CPL OF THE SCREEN  
INCLUDING ALL GRAPHICS... POKE 235489!

I DON'T REMEMBER IF MY LAST LETTER MENTIONED THAT I HAVE FINALLY  
SOLVED THE INTERMITTENT "LOAD" PROBLEM OF THE T/S  
2068...REMOVING R11 HAS COMPLETELY SOLVED THE PROBLEM...SEE  
ATTACHED COPY OF LETTER TO FRED NACHBAUR...

THANKS AGAIN FOR YOUR HELP

SINCERELY YOURS,

STAN HASBRO

sent 11/84  
if note about  
Bach's work

STAN HAS BEEN SENT A COPY OF THE ARTICLE.

(C) 1985 A. RODRIGUEZ  
\*\*\*\*\*  
A B C  
CASH -1 FLOW START  
CASH \*\*\*\*\*  
INTEREST \*\*\*\*\*  
CSH BEGN \*\*\*\*\*  
CSH. ACT \*\*\*\*\*  
\*\*\*\*\*  
LN OF CD  
STK SALE  
TL. RCT  
\*\*\*\*\*  
SUB-MENU  
S = SAVE PROGRAM TO TAPE  
M = RETURN TO MENU

1/2 SIZE

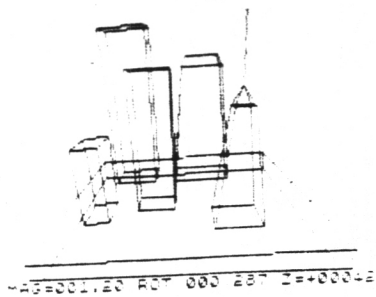


# Graphics

LI.S.T. Group

LONG ISLAND  
STREETART TIME  
GROUP

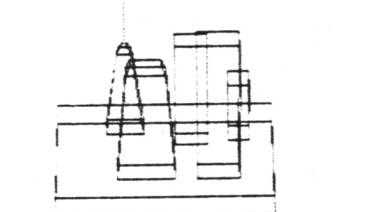
A City-scape in VU-3D  
Bob Malloy



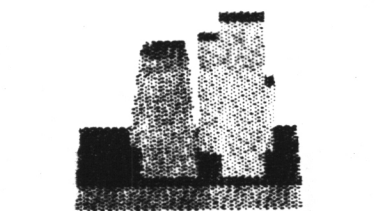
MAG=001.20 ROT 000 257 Z=+000+2



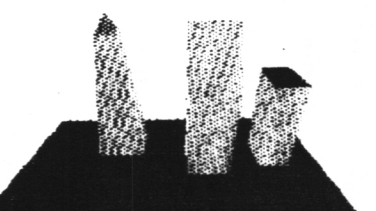
MAG=001.20 ROT 000 257 Z=+000+2



MAG=024.75 ROT 180 125 Z=+01202

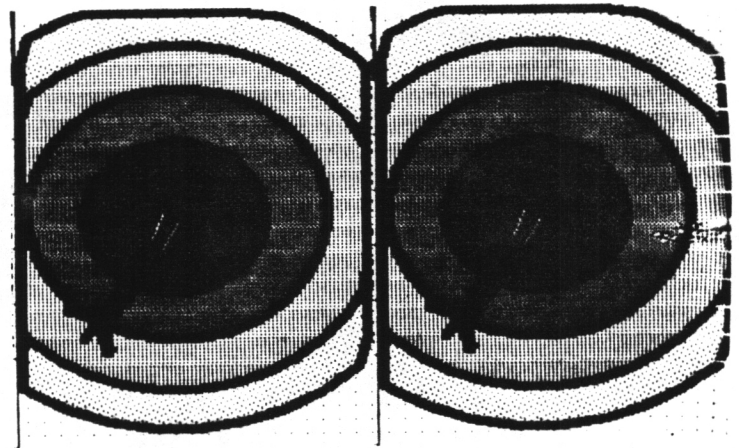
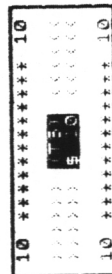


MAG=025.16 ROT 180 111 Z=+03202



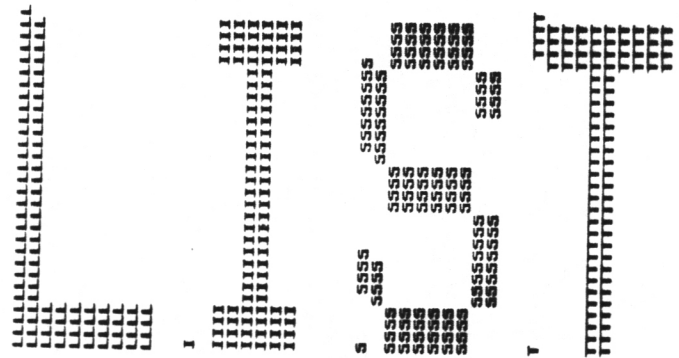
MAG=001.25 ROT 180 116 Z=+00002

FUNNY MONEY  
FROM E Jenkins



RIGHT ON TARGET from Z-TABLET

YS TOP TWENTY CHART			
1	4	DAVEY THOMPSON'S DECATON 88	ULTIMATE
2	3	DAVEY THOMPSON'S DECATON 88	ULTIMATE
3	8	DAVEY THOMPSON'S DECATON 88	ULTIMATE
4	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
5	3	DAVEY THOMPSON'S DECATON 88	ULTIMATE
6	11	DAVEY THOMPSON'S DECATON 88	ULTIMATE
7	5	DAVEY THOMPSON'S DECATON 88	ULTIMATE
8	2	DAVEY THOMPSON'S DECATON 88	ULTIMATE
9	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
10	2	DAVEY THOMPSON'S DECATON 88	ULTIMATE
11	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
12	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
13	11	DAVEY THOMPSON'S DECATON 88	ULTIMATE
14	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
15	11	DAVEY THOMPSON'S DECATON 88	ULTIMATE
16	11	DAVEY THOMPSON'S DECATON 88	ULTIMATE
17	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
18	6	DAVEY THOMPSON'S DECATON 88	ULTIMATE
19	1	DAVEY THOMPSON'S DECATON 88	ULTIMATE
20	3	DAVEY THOMPSON'S DECATON 88	ULTIMATE



8/85

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## Supplier News

### VENDOR

EWL Co  
249 West Dayton-Yellow Spring Road  
Fairborn, Oh 45324  
(513) 878-9454

DAMCO  
67 Bradley Ct.  
Fall River, Ma. 02720  
(617) 678-2110

Frank Lockhart  
PO Box 4095  
Ormond Beach, Fla. 32075-4095  
(904) 255-2514

Knighted Computers  
707 Highland St.  
Fulton, NY 13069

Peech II Productions  
6333 Parkman place  
Cincinnati, OH 45213  
(513)-351-5020

English Micro Connection  
15 Kilburn Ct  
Newport RI 02840

Zebra systems  
78-06 Jamaica Ave.  
Woodhaven, NY 11421  
(718)-296-2385

English Micro Connection

Zebra Systems

DAMCO

LIST ASSOCIATES  
Box 436

National Software Library  
42 Harefield Avenue  
Cheam, Surrey SM2 7NE England

Thoughts And Crosses  
37 Market St.  
Heckmondwike, West Yorks.

Speedysoft  
86 Howard's Lane

### SERVICE

RS-232 interface for TS1000

Exclusive retailer of ROTRON'S Wafa-Drive  
Now sells DK 'Tronics Products  
Light Pen - \$30.00  
Speech Synthesizer - \$35.00 (SPO 256 with  
text-to-speech), etc.

Engineering design, educational & games  
programs E.g., 'Belt & Chain Drive',  
'Terror from Mars',  
'Math UDG's'  
Prices \$6.95 - TS1000  
\$9.95 - TS2068

Broad selection of  
2068 & Spectrum Hardware &  
Software. Mostly List price.

Draw II and Concert II each @ \$19.95  
Both use icons instead of menus.

### SPECTRUM SUPPLIERS

#### IN U.S.

Can get most hardware  
and software at good prices.

Software titles, some hardware  
Super Twister out soon.

Wafa Drive & DK'Tronics

Acts as your agent on Software  
and hardware, for a fee. Stocks  
Spectrum Rom's only (\$13.00 to  
LIST members)

#### IN U.K.

Rents Spectrum Software & Sells  
Hardware & Software - Does not  
take plastic.

Sells Spectrum Software at discount.  
Some hardware - Takes plastic.

Formerly Software Supermarket  
Takes Plastic, phone orders &  
uses AIR MAIL. Charges full list  
price, plus a premium for overseas

## Hardware Directory

## Sinclair spares and repairs

IF, LIKE MANY other Spectrum  
owners, you find one day that your  
computer has died, you will have a  
major problem on your hands. Phoning  
the Sinclair Research customer relations  
department in Camberley will not help  
very much either.

If your electronics knowledge is  
limited, then you will decide to send  
your Spectrum to one of the companies  
who specialise in repairing computers.  
If you have a good working knowledge  
of electronics then the addresses listed

below should enable you to obtain  
most replacement  
parts to repair your  
computer. Some of the  
simpler repairs, such as  
those involving keyboards  
can be undertaken by those  
with limited knowledge.

If your computer is under  
guarantee then it is important that  
you do not invalidate that guarantee.  
Talk to the customer service division at

Sinclair Research and they  
will tell you where  
to send it. When returning  
the computer put a note in  
describing the fault as briefly as  
possible, as this will speed the repair  
process.

### Suppliers of Sinclair parts:

Adaptors and Emulators, 14 Thames Street, Louth, Lincolnshire.  
(050782) 8011. Spectrum and ZX-81 power supplies.  
ASTEC (UK), 16 Albany Close, Reading, Berkshire. (0734) 53067. Supplies  
modulators for all countries PAL, NTSC, SECAM.  
CPC, 194-200 North Road, Preston, Lancashire. (0772) 555034. Supplies all  
parts for Spectrum, ZX-81, ZX printer, ZX RAM pack including all case  
parts, power supplies and keyboard parts. Probably the best place to get ULA,  
ROM, case parts and keyboard.  
Ferranti Semiconductors, Computer Road, Hollinwood Avenue, Oldham,  
Lancashire. (061) 682 6844, (061) 624 0515/6661. Supplies Spectrum and ZX-  
81 ULA.  
Maplin Electronics, Southend-on-Sea, Essex. (0702) 552961. Supplies  
general components and data and technical books.  
National Semiconductors (UK) Ltd, 301 Harpur Centre, Horse Lane,  
Bedford. (0234) 47147. Supplies Spectrum RAM/74LS series TTL; LM 1889  
video chip.  
NEC (UK) Ltd, Block 3, Carfin Industrial Estate, Motherwell. (0698) 73221.  
Supplies Spectrum ROM and RAM/74LS TTL; Z80A.  
Sinclair Research Ltd, Camberley, Surrey. (0276) 685311.  
Texas Instruments, Manton Lane, Bedford, Bedfordshire. (0234) 223000.  
(0234) 211655. Supplies RAM 4116, 4532, 4164, 74LS TTL (Spectrum).  
Times Corporation, Camperdown Plant, Harrison Road, Dundee, Tay-  
side. (0382) 819211. Makers of Spectrum, ZX-81, Printer, Interface one,  
Microdrives, RAM Pack. Repair and service for Sinclair.  
Vernon (Computerfit), Units 2H & 2J, Albany Park, Primley Road,  
Camberley, Surrey. (0276) 66266. Repairs Spectrums and ZX-81.  
Zilog (UK) Ltd, Zilog House, 45-53 Moorbridge Road, Maidenhead,  
Berkshire. (0628) 39280. Supplies Z80A.

### Component companies

SOME OF THE large companies mentioned above do not like  
dealing directly with the public. The following is a list of  
component companies which should be happy to deal with  
you. Most will have catalogues available and will supply data  
sheets for their products on demand.

These firms are only distributors and they do not make  
components. If you have a problem with a particular device  
contact the manufacturer as listed above because not many of  
the distributors can answer technical questions; RS Com-  
ponents, Farnell, Ambitt and Hawkes may do. Anyone need-  
ing NEC parts should phone them direct and ask for some  
distributors dealing with them.

Abacus Electronics, Kennet House, Pembroke Road, Reading, Berkshire.  
(0734) 33311. Makes deals with: National Semiconductors, SGS.  
Access Electronic Components Ltd, Austin House, Bridge Street, Hit-  
chen, Hertfordshire. (0462) 57244. Makes deals with: National Semiconduc-  
tors.

Alpha Electronic Components Ltd, 66 Wilbury Way, Hitchin, Hertford-  
shire. (0462) 57244. Makes deals with: National Semiconductors.  
AM Lock Distribution Ltd, Nevill Street, Middleton Road, Oldham,  
Lancashire. (061) 652 0431. Makes deals with: Motorola, Mostek.

Anase Components Ltd, Burnham Lane, Slough, Buckinghamshire.  
(06286) 4701. Makes deals with: Hitachi.  
Axlon Electronics Ltd, Unit F, Turnpike Road, Cressen Industrial Estate,  
High Wycombe, Buckinghamshire. (0494) 442181. Makes deals with: Motor-  
ola.  
BA Electronics Ltd, Millbrook Road, Yate, Bristol. (0454) 315824. Makes  
deals with: Texas Instruments.  
Caldie Ltd, 37-39 Lovelock Road, Reading, Berkshire. (0734) 585171.  
Makes deals with: Motorola, Mostek.  
Creston Electronics Ltd, 380 Bath Road, Slough, Berkshire. (06286) 4434.  
Makes deals with: Motorola, SGS, Zilog.  
Dialogue Distribution Ltd, Watchmore Road, Camberley, Surrey. (0276)  
682001. Makes deals with: Hitachi.  
DTV Group, 10-12 Earnest Avenue, West Norwood, London SE27. (01) 670  
6166. Makes deals with: National Semiconductors.  
Farnell Electronics Components Ltd, Canal Road, Leeds. (0532) 636311.  
Makes deals with: Hitachi, National Semiconductors.  
Hawke Electronics Ltd, Annotex House, 45 Hanworth Road, Sunbury-on-  
Thames, Middlesex. (01) 979 7799. Makes deals with: Motorola, Texas  
Instruments. Will answer technical queries.  
Hill Electronics (NI) Ltd, 290 Antrim Road, Belfast, Northern Ireland.  
Makes deals with: Mostek.  
ITT Multicomponents, Edinburgh Way, Harlow, Essex. (0279) 442971.  
Makes deals with: Motorola, National Semiconductors, SGS, Texas Instru-  
ments and Hitachi.  
Macro Marketing Ltd, Burnham Lane, Slough, Berkshire. (06286) 4422.  
Makes deals with: Motorola, National Semiconductors, Zilog, Texas Instru-  
ments.  
Quarndon Electronics Ltd, Slack Lane, Derby. (0332) 32651. Makes  
deals with: Texas Instruments.  
STC Electronics, Edinburgh Way, Harlow, Essex. (0279) 26777. Makes  
deals with: Motorola, National Semiconductors, SGS, Texas Instruments and  
Hitachi.

### Computer parts

Z80A: Zilog, SGS, NEC (Spectrum/ZX-81).  
ULA: Ferranti (Spectrum/ZX-81).  
ROM: Hitachi, NEC (Spectrum); Mostek, Motorola (ZX-81).  
RAM: 4116 type - NEC, National Semiconductors, Texas Instruments,  
ITT (Spectrum). 4532 type - Texas Instruments, OKI (Manhattan Skyline).  
2114 type - Motorola, NEC (ZX-81). 4118 type - Mostek (ZX-  
81). 2K type - Mostek, Toshiba, Motorola, Texas Instruments, NEC (ZX-  
81).  
LM1889: ICI - National Semiconductors (Spectrum).  
TTL: 74LS00/74LS132/74LS157 - Texas Instruments, SGS, Motorola,  
National Semiconductors, NEC.

The following are all used on the 48K Spectrum.  
Regulator: LM7805 +5V Reg. - SGS, NEC, Texas Instruments, Motor-  
ola.

Crystals, Capacitors, Resistors, Diodes, Sockets: available through  
general component suppliers.

Modulator: UM1233 Astec (UK) Ltd.

Leads: available at most TV/Electrical shops.

Case parts: Stencils Plastic.

Keyboard: CPC.

## HARDWARE REVIEW

ITEM: ZEBRA TALKER  
FROM: ZEBRA SYSTEMS - 78-06 JAMAICA AVENUE, WOODHAVEN, N.Y. 11421 - (718)296-2385  
FOR: TS 2068 (ALSO FOR TS1000)  
FUNCTION: VOICE SYNTHESIZER  
PRICE: \$69.95 + P&H

Actually this article is a "system" review of Zebra-Talker, as quite a bit more than the phoneme synthesizer hardware is provided by Zebra. Let's start with that hardware though, and then discuss the rest of the system.

### THE HARDWARE

The Zebra-Talker consists of a moderate sized (3" X 3 1/2") add-on board which fits on the back of your 2068 (or TS-1000). The board is very simply and cleanly laid out and is single-sided. It is not encased, but covered, front and back, with pieces of heavy black cardboard, attached with double-sided tape. On the board are mounted: 6 IC's, a power jack, (submini-9V), output audio cable (1/8") and some assorted passive components. 5 of the IC's are garden variety TTL chips which provide decoding and buffering (latched). The sixth is the well known Votrax SC-01 phoneme synthesizer chip. Zebra also supplies a 9Volt supply, so the board does not need to use computer power. There is a ZX-81 size through-connector for other add ons.

Zebra Talker is (almost) fully decoded, and responds to I/O ports 190 and 191, decimal. The audio output is low level and requires some sort of external amplifier. Zebra can supply a small battery-operated Radio Shack amplifier for \$13.00 more which does a good job of delivering the SC-01's output. The SC-01 responds to 64 different input codes by producing synthetic versions of 64 phonemes. Phonemes, as discussed in our article or by producing synthesizers in general, are those basic building blocks of speech from which all words can be constructed. By sending the Hex bytes 1B (for H), 3C (for E) and 29 (for Y) to the SC-01, in succession, we can make it produce the synthetic equivalent of the word "HEY".

The SC-01 has been around since 1981, so you probably have heard its "robot"-like tones either in the movies or on TV. The speech is obviously not human and one must adjust one's "listening" level as if listening to a moderate foreign accent. A consensus of members at our last user group meeting was that, compared to RIST's Parrot, which uses the G.I. AP0256 the SC-01 sounds a little "wimpy". The phoneme set is composed of some 35 vowels and only 3 stops, as opposed to GI's 22 vowels and 5 stops (Both provide a total of 64 phonemes) and this may help explain why the sound is both higher pitched and seems more dragged out. Samples of both units speaking the same phrase will be placed on an upcoming LIST library tape so that our members can tell us which voice they think is more life-like. For now, while you can't hear the sounds, we can give you some idea of the difference as follows:

To make the sound "I" (eye):

	Parrot	Zebra Talker
Chip	SPO-250	SC-01,
Vendor	General Instrument	VOTRAX
Codes (decimal)	06	21,0,9,41
(HEX)	06	15,00,09,29
Allophone Name	AY	AH1,EH3,I3,Y
My Representation	I or iy	iiiey
Comment	Forceful, short	Drawn out, high pitched

The pitch of the SC-01 can be changed through 4 levels; something very difficult to do on an SPO256, but I found even the lowest level to seem higher than that of the G.I. chip. Still, each chip could pronounce some words more clearly than the other, and the interpretation of the sounds seems very subjective.

### SOFTWARE

Equally as impressive as the Zebra hardware, is the software supplied with the system. While you can drive the I/O port directly through simple IN and OUT commands, the two programs provided with the unit make development and testing of phrases for use with your own programs fairly easy.

The first program is the Zebra Phoneme Editor. This program allows you to enter phoneme representation (e.g., AH1, as above) of your words, one after the other and then edit and tweak your code until it suits your ear. A command menu and cursor editing make using the editor quite simple. After you have entered and debugged your phrase you can get a print-out, like the one shown below, of the phonemes, their decimal codes CHR's etc. The codes of the various phonemes can then be entered into Data statements in your own program and executed simply by including a simple For-Next loop which outputs the codes to the SC01. A brief, straightforward example of this technique is provided in the documentation.

## TS MAGAZINES

In this month's magazine section we are going to cover three of the best TS publications available for us here in the U.S. We are talking specifically about the following:

T-S Horizons  
Time Designs Magazine  
Sinclair Users Magazine (SUM)

T-S Horizons has been reviewed (very favorably) before in this newsletter. It is put out by Rick and Scott Duncan on almost a monthly basis. Every now and then they get a bi-monthly issue but that is not often. Still to prevent confusion, they sell subscriptions by 12 issues, so you have the possibility of your subscription lasting over a year. Price is 12 issues for \$15.00. They always have a lot of TS1000 and 2068 info, plus a telecommunications section. Averages 32 pages per issue. (Write them at 2002 Summit St., Portsmouth, OH 45662.)

Time Designs Magazine seems to aimed more at the 2068 than the 1000. They have more news on the TS community than the others do. They also talk a lot about the TS Spectrum and Spectrum compatible 2068s. They do not cover the 1000 very much. They put out 36 pages on a bi-monthly basis. Cost for 6 issues is \$15.00. We will note that they produce their magazine on 6 1/2 by 11 inch pages & mail them out in business size envelopes so you get them in perfect condition, not all mucked up. (Write to: 25722 Mult Rd, Cotton OR 97017.)

SUM is for the Timex hacker in all of you. They have a lot of "Build This" type of articles. They also cover the TS1000. If you are a hacker, you will love this one. They are currently running articles on how to build your own 2068 centronics interface. They also have several software reviews each issue. They run about 12 pages an issue and are monthly. Cost is 6 issues for \$6.00 or 12 issues for \$12.00. (See ad.)

All of these publications are very nice and it would be hard to write here which one to get. If you have the money, get all three. They are all great. They need your support to grow. Remember: Support the TS market.

THANKS TO STUN

Syncware News  
P.O. Box 64  
Jefferson, NH 03583

Another fine publication, SWN has technical and scientifically oriented articles. It's \$16.95/yr & runs to 24 pages /double issue.

The second program supplied is the really crowning achievement of this package and the one with which most people will have the most fun. This is the Text-to-Speech program. It comes in two parts; a machine language stream initialization program which resides at 59,000 (and above) and a BASIC demo program which provides some example phrases and then lets you enter your own phrases for the unit to speak.

Stream #4 is set up to put your text out to the SC-01, by the machine code and this makes the use of this very sophisticated routine virtually transparent to the user. You need only enter:

"PRINT #4; "HELLO WELKUM TO LIST" and the Z-talker will speak your phrase. All the house-keeping is handled by the machine code routine. The routine sets up Stream #4 then takes your phrase, applies a complex text-to-speech routine to it and then OUTPUTS the proper phoneme codes. To do this, the MC routine contains a very involved "rule-table". This last specifies how certain letter combinations should be pronounced depending on their position in a word. Zebra claims that their text-to-speech algorithms will catch about 90% of most english words and that seems a reasonable estimate, based on our tests. You can pick up another 5-8% of words by "fudging" (it says so in the manual) the spelling which you send to the routine. Notice how we spelled wellcome with a 'K' above? You can attach the T.T.S. M.C. routine to your own programs (SAVE "TTS" Code 59200, 6000) and then need only initialize it once to be able to use it in your programs. Do note that if you wish to print to the screen, as well as say a phrase, you must use a regular PRINT command in addition to the PRINT #4.

#### DOCUMENTATION

The Votrax SC-01 "Phonetic Speech Dictionary" and Zebras operating manual are both included with your 'Z-Talker'. The former is a 20 page listing of about 600 words and their phoneme symbols. This can be a great help in setting up your own phrases, though, I would like to have seen the numeric codes included, as well.

Zebra's 14 page booklet is succinct, though it should be sufficient to allow immediate use of the program, even for beginners. The phoneme editor, system set up and text-to-speech areas are all explained in enough detail and even the major break points in the machine code are provided.

While the documentation is adequate, it is not outstanding. I would like to have seen a schematic (though making my own was not hard-just ugly) and more data on the SC-01. I'm reasonably sure Zebra could have obtained technical data sheets on the chip and supplied them to the user. As far as the Zebra manual goes, I would like to have seen more information or the text-to-speech rule tables i.e., where are which rules and their use. There are a few examples in the text and only one direct tie-in with the SC-01 manual.

The promised table 1 was not included in my copy of the booklet.

My interest in the rule table is not a casual one. I could not get my Z-talker to pronounce the 'P' in LIST GROUP. It always came out as another voiceless stop, usually T. Still, Zebra's Jeff Street is working on the problem and I have seen an advance manual for a rule table editor program. If this software is produced, it would be a valuable addition for those users who really want to tweak their Z-talker.

On the whole, my criticisms of Z-talker; adequate but not outstanding documentation, need for an external amplifier (many can use their tape recorder set on monitor) the short extension-bus, and lack of a case are not severe ones. The ease of use and the excellent software make this package an outstanding introduction to the use of speech synthesizers and I would rate Z-talker an 8-out-of-10. While Zebra hesitates to sell kits (too many fumble fingered buyers get turned off to the seller) I would encourage them to supply this one as a kit or semi-kit (just the bare board). This, in particular, because the unit is a bit pricey when compared to the competition from the U.K. At about \$50.00 (or below) I would boost my rating from 8-out-of-10 up to the 9-out-of-10 level.

#### System Variables or Hexadecimal Addresses

P-RAMTOP	
UDG	User Defined Graphics Table
RAMTOP	
	Spare Space
STKEND	
STKBOT	Calculator Stack
	Temporary Work Space
WORKSP	Input Data
E-LINE	Edit Buffer
VARs	BASIC Variables
	BASIC Program
PROG	
CHANS	Channel Information
6277h	Bank Switching Code
6200h	Function Dispatcher
	Stack
5FF7h	
5C00h	System Variables
5B00h	Printer Buffer
5800h	Attributes File 1
	Display File 1
4000h	
	Main System ROM Software
0000h	

#### Standard Home Bank Memory Map

### Password

Blackburn,  
Lancashire.

THIS PASSWORD program for the Spectrum 48K will cause the listing to be jumbled. Only the correct password will restore the program and the program cannot be run without it.

The program should be typed in as listed and saved on tape.

After writing your message or short program the Password program should be loaded with Merge ". Your program should not have any line numbered any higher than 9983. Then type

GOTO 9985

The program will ask for a password which, when Entered, will cause the screen to go blank and then show a Stop Statement.

You listing is now coded according to the password and can be saved as before with

SAVE "name" LINE 9985

When the program is reloaded the correct password must be entered to run the program.

It works by XORing the byte in the Basic program listing with the ASCII code of the password which is sliced in a loop.

Line 9991 looks for line 9984 to prevent poking the password program itself. Lines 9991 and 9992 prevent Poking into undesirable places. The short machine code routine does the XORing.

If you take two numbers and XOR them, then take this result and XOR it with one of the original numbers you will get the second original number.

```

9984 STOP STOP
9985 RESTORE CLEAR 32499 LET
:32500
9986 FOR I=0 TO 11 READ A POKE
:32501 I A NEXT I
9987 DATA 88,232,128,237,75,242,
128,6,8,169,79,281
9988 INPUT "Password:" B$
9989 LET X=1
9990 FOR N=23759 TO 168
9991 IF PEEK N=13 THEN LET N=N+4
NEXT N
9992 IF PEEK N=14 THEN LET N=N+5
NEXT N
9993 IF PEEK N=238 AND PEEK N=2
=228 THEN STOP
9994 POKE 32499 PEEK N POKE 328
18 CODE B$(X):128
9995 LET (ADDR 32500) IF .32 TH
EN NEXT N
9996 POKE N,L
9997 LET X=X+1
9998 IF X=LEN B$ THEN LET X=1
9999 NEXT N

```

YOUR COMPUTER, JUNE 1985

#### COMMUNICATIONS CORNER

Heinz H. Mentions that for the Byte-Back/Tasword fix noted in last months LISTING, you may have a problem if you GOTO 10 to start. If so, just put the OUT statements in lines 1 to 6 in line 10. Heinz just added a colon and the statements to his line 10. He also adds that 206 (decimal) is the better baud rate for the Brother EP44.

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